HTTP and HTTPS traffic:

HTTP:

A few things to keep in mind about HTTP:

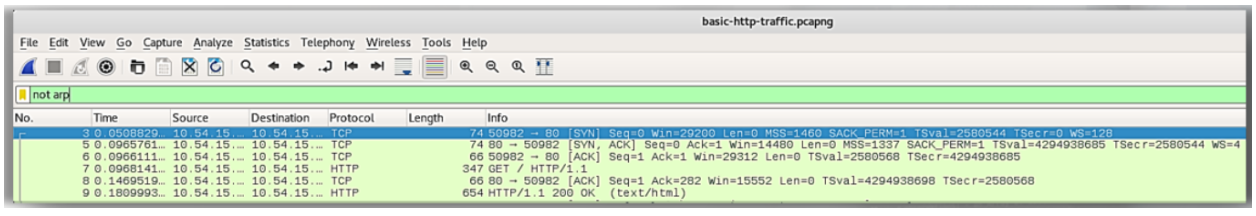
- Its client server protocol and the Client will request and the Server will respond
- HTTP responses include a 3 digit status code:
- HTTP messages include a message Header and Body
- HTTP uses methods to perform deferent actions like GET, POST, PUT, DELETE, OPTION,HEAD, PATCH.
- Not all METHODS are allowed to be used, mean all method are not permitted.

Some facts to distinguish Normal and Suspicious HTTP traffic:

Normal HTTP Traffic	Suspicious HTTP Traffic
Port 80, TCP Port 8080, TCP (used as alternate) Port 8088, TCP (used as alternate)	Malicious binaries (backdoors), scripts, web shells, etc. will use this port because typically, in all corporate environments, the port is open.
Plaintext traffic	If the traffic is encrypted, then most likely it's being used for malicious traffic. Malicious traffic can be in plaintext as well.
Web server typically in FQDN format.	The server will point to an IP address instead of FQDN format.

Since port 80,443 are open in all environment so the workstation con connect to websites in organization so they can do their job and this can be used in malicious way. If we cant see the data transmitted in the HTTP packet mean its encrypted then it also suspicious. If we see a host is communicating over HTTP but its going to an IP not a FQDN or domain.

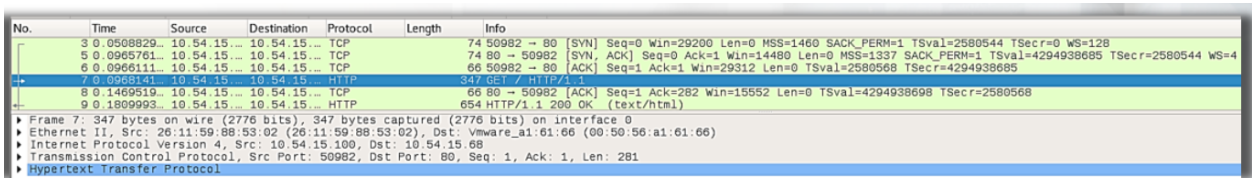
HTTP Normal Traffic:



Summary of the above packets:

- We are seeing 6 packets which 4 of them related to TCP and 2 of them to HTTP
- Packet 3,5,6 is the 3 way handshake, mean the HTTP protocol is sending its data over TCP and TCP connection starts with 3 way handshake.
- In packet 7 we see the HTTP method GET.
- In packet 9 we see the HTTP response code 200 OK.

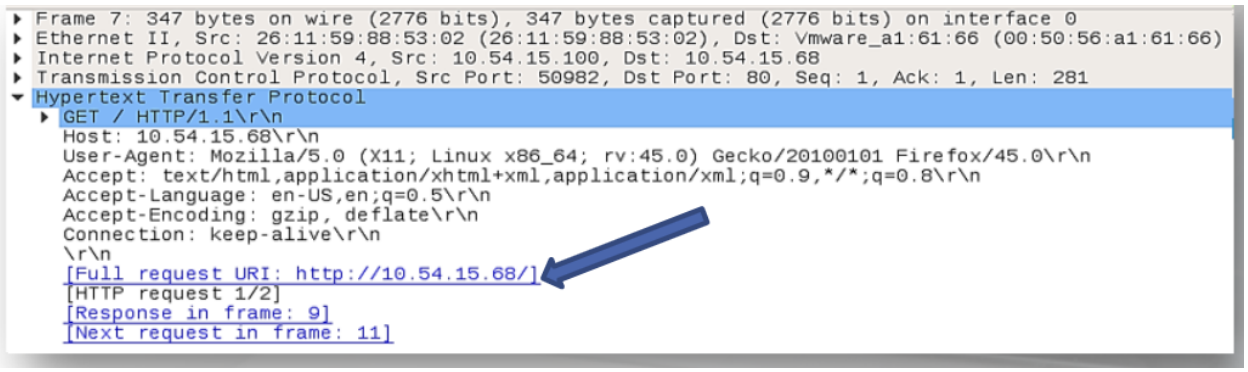
Lets look at the first packet information:



- We see the Ethernet: which is the source/Destination MAC address
- We see the Internet Protocol which shows the SRC/DEST IPs
- We see the TCP, which shows the SRC/DEST Ports.
- And we see the HTTP

So far we see the HTTP traffic is over DEST port 80, but it can be any port but the port 80 is the standard port for HTTP and seeing traffic over another port can be suspicious.

Lets look at the HTTP section of this packet:



We see in the first Line the HTTP Method, and we see in the HOST an IP not FQDN mean not the Domain name, as we know direct connection to IPs should be suspicious, but here its pointing to an Internal IP and that's a normal behavior as we might don't have Internal DNS servers.

From the bottom 2 line we see "Response in frame: 9" which means the response to this GET request in this packet 7 is in packet 9 and if we click it will take us to the packet 9 and lets do that.

```
▸ Frame 9: 654 bytes on wire (5232 bits), 654 bytes captured (5232 bits) on interface 0
▸ Ethernet II, Src: Vmware_a1:f4:d0 (00:50:56:a1:f4:d0), Dst: 26:11:59:88:53:02 (26:11:59:88:53:02)
▸ Internet Protocol Version 4, Src: 10.54.15.68, Dst: 10.54.15.100
▸ Transmission Control Protocol, Src Port: 80, Dst Port: 50982, Seq: 1, Ack: 282, Len: 588
▾ Hypertext Transfer Protocol
  ▸ HTTP/1.1 200 OK\r\n
    Date: Tue, 23 May 2017 17:23:14 GMT\r\n
    Server: Apache/2.2.22 (Debian)\r\n
    X-Powered-By: PHP/5.4.4-14+deb7u14\r\n
    Vary: Accept-Encoding\r\n
    Content-Encoding: gzip\r\n
  ▸ Content-Length: 315\r\n
    Keep-Alive: timeout=5, max=100\r\n
    Connection: Keep-Alive\r\n
    Content-Type: text/html\r\n
    \r\n
    [HTTP response 1/2]
    [Time since request: 0.084185252 seconds]
    [Request in frame: 7]
    [Next request in frame: 11]
    [Next response in frame: 12]
    Content-encoded entity body (gzip): 315 bytes -> 546 bytes
    File Data: 546 bytes
▾ Line-based text data: text/html
    <!DOCTYPE html>\n
    <html>\n
```

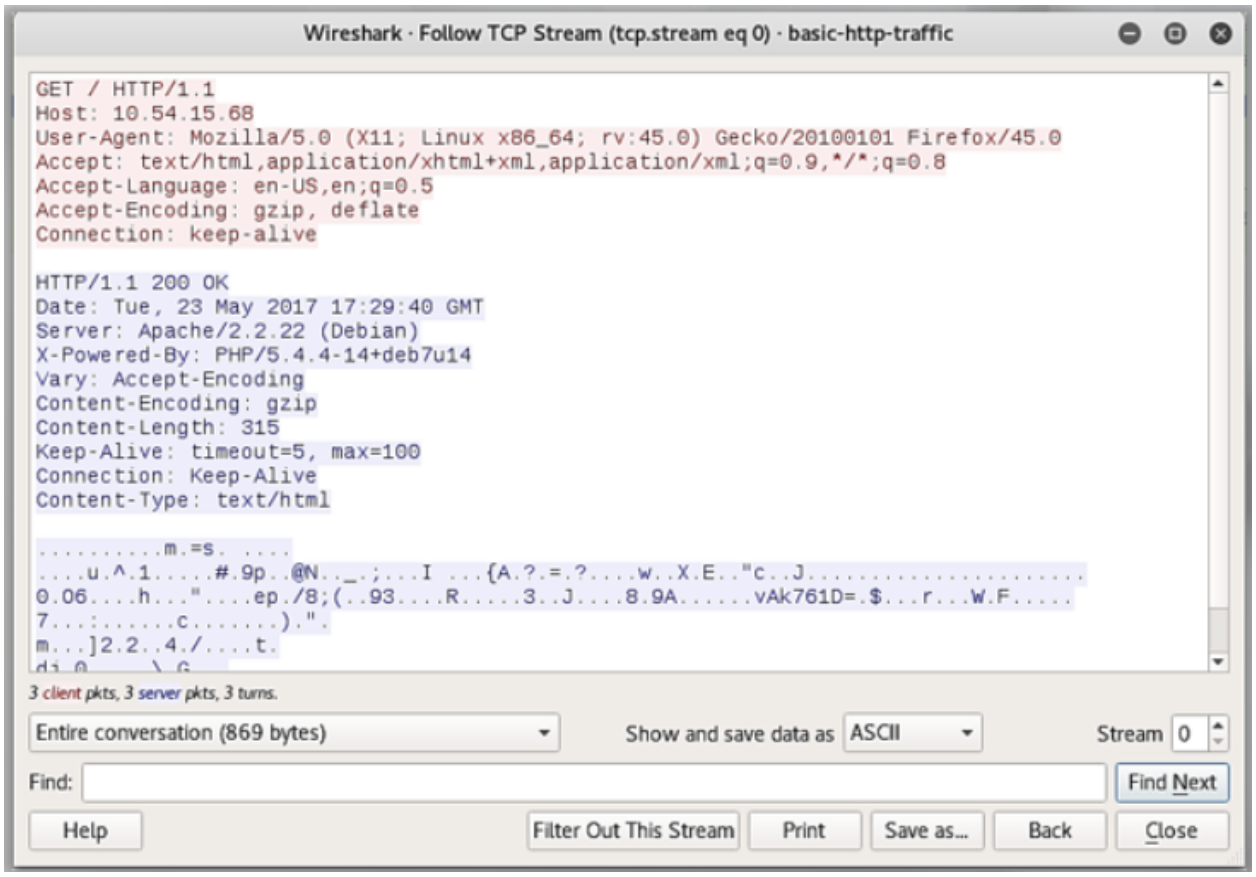
And in here we can do the same Jumping by clicking the “Request in frame: 7” which will take us back to the Request packet of this response packet.

At the bottom we see the “Line-based test data: text/html” here it tell us what kind data we got in response and it will also show the data it self, which is text/html and lets look at it:

```
▾ Line-based text data: text/html
    <!DOCTYPE html>\n
    <html>\n
    \n
    <head>\n
    \n
      <meta charset="UTF-8">\n
    \n
      <title>Log-in - login.labs</title>\n
    \n
        <link rel="stylesheet" href="css/style.css" media="screen" type="text/css" />\n
    \n
    </head>\n
    \n
    <body>\n
    \n
      <div class="login-card">\n
        <h1>Log-in</h1><br>\n
      <form method="post" action="login.php">\n
        <input type="text" name="user" autocomplete="off" placeholder="Username">\n
        <input type="password" name="pass" placeholder="Password">\n
        <input type="submit" name="login" class="login login-submit" value="login">\n
      </form>\n
    \n
    </div>\n
    \n
    </body>\n
    \n
    </html>\n
```

Here we see the HTML which looks like the Login Page.

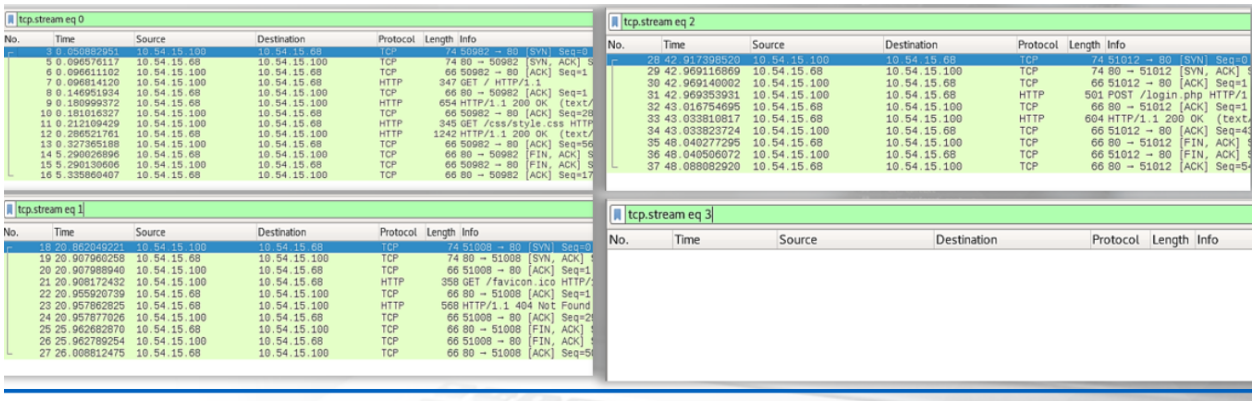
The same information can be obtained by right clicking the packet then click Follow > Follow TCP Stream, no matter we click the Respond or the Request, it will show both the data sent and the receive.



The red is the Data we sent, so like if it was POST request like logging, we would see it in Red color which is what we sent and the Blue is the response we got which we see the header and the data is in Blue.

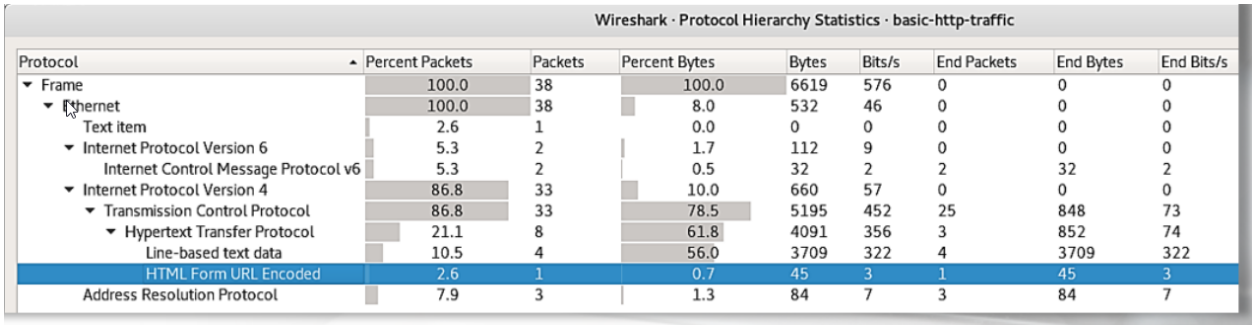
NOTE: HTTP is clear text protocol that mean there is no encryption so if this traffic is intercepted then it will be readable.

If want to display the streams, then we can use this filter:



Protocol Hierarchy Statistics:

Here we can see the protocols that are within the PCAP file we looking at:

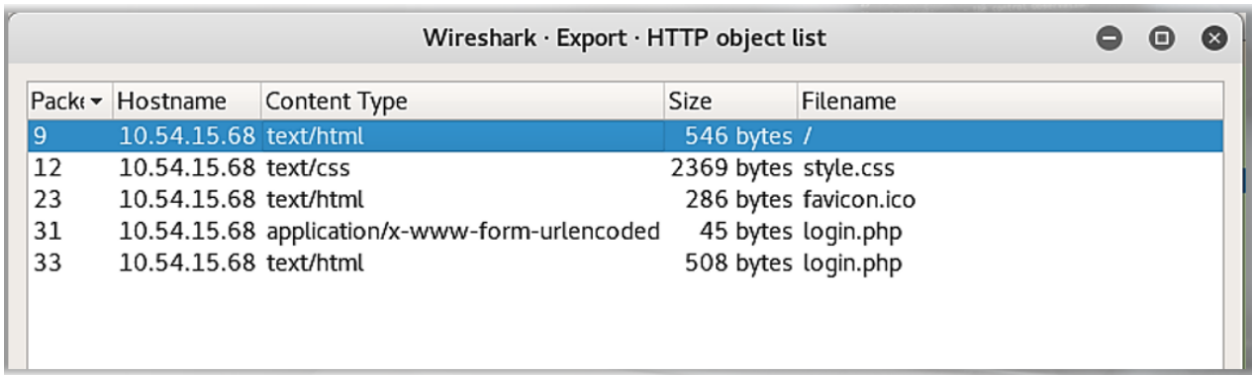


Protocol	Percent Packets	Packets	Percent Bytes	Bytes	Bits/s	End Packets	End Bytes	End Bits/s
Frame	100.0	38	100.0	6619	576	0	0	0
Ethernet	100.0	38	8.0	532	46	0	0	0
Text item	2.6	1	0.0	0	0	0	0	0
Internet Protocol Version 6	5.3	2	1.7	112	9	0	0	0
Internet Control Message Protocol v6	5.3	2	0.5	32	2	2	32	2
Internet Protocol Version 4	86.8	33	10.0	660	57	0	0	0
Transmission Control Protocol	86.8	33	78.5	5195	452	25	848	73
Hypertext Transfer Protocol	21.1	8	61.8	4091	356	3	852	74
Line-based text data	10.5	4	56.0	3709	322	4	3709	322
HTML Form URL Encoded	2.6	1	0.7	45	3	1	45	3
Address Resolution Protocol	7.9	3	1.3	84	7	3	84	7

It shows the protocols based on the OSI layer kind, like we see the Frame, Ethernet, IPv6, IPv4, HTTP, … here we see how many packet falls under which protocol as well. Like the IPv4 has 86.8 % of the packets which are 33 packets and then we have HTTP which is 21.1% and its 8 packets.

Export HTML Objects:

With this feature of Wireshark, we can save the objects like if an Image, a Binary, script is sent via HTTP, we can retrieve it like this.



Packet	Hostname	Content Type	Size	Filename
9	10.54.15.68	text/html	546 bytes	/
12	10.54.15.68	text/css	2369 bytes	style.css
23	10.54.15.68	text/html	286 bytes	favicon.ico
31	10.54.15.68	application/x-www-form-urlencoded	45 bytes	login.php
33	10.54.15.68	text/html	508 bytes	login.php

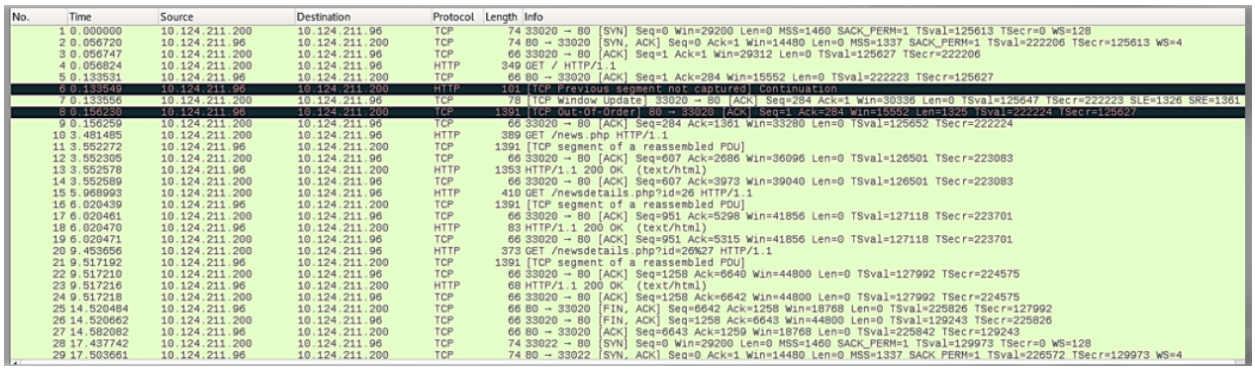
Suspicious HTTP traffic:

We have to remember:

- The typical port of HTTP is 80

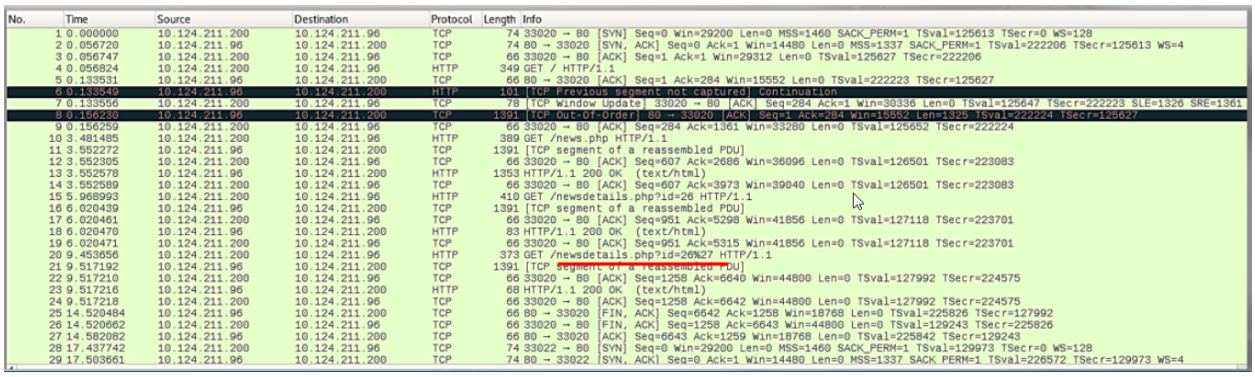
- Its clear text protocol
- Hosts are accessed using FQDN instead of IP addresses

Lets look at this what look suspicious to us?



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.124.211.200	10.124.211.96	TCP	74	33020 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=125613 TSecr=0 WS=128
2	0.056720	10.124.211.96	10.124.211.200	TCP	74	80 → 33020 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=222206 TSecr=125613 WS=4
3	0.056747	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=125627 TSecr=222206
4	0.056824	10.124.211.200	10.124.211.96	HTTP	349	GET / HTTP/1.1
5	0.133531	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [ACK] Seq=1 Ack=284 Win=15552 Len=0 TSval=222223 TSecr=125627
6	0.133549	10.124.211.96	10.124.211.200	HTTP	101	[TCP Previous segment not captured] Continuation
7	0.133556	10.124.211.200	10.124.211.96	TCP	78	[TCP Window Update] 33020 → 80 [ACK] Seq=284 Ack=1 Win=30336 Len=0 TSval=125647 TSecr=222223 SLE=1326 SRE=1361
8	0.156230	10.124.211.96	10.124.211.200	TCP	1391	[TCP Out-Of-Order] 80 → 33020 [ACK] Seq=1 Ack=284 Win=15552 Len=1325 TSval=222224 TSecr=125627
9	0.156259	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=284 Ack=1361 Win=33280 Len=0 TSval=125652 TSecr=222224
10	3.481485	10.124.211.200	10.124.211.96	HTTP	389	GET /news.php HTTP/1.1
11	3.552272	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
12	3.552305	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=607 Ack=2686 Win=36096 Len=0 TSval=126501 TSecr=223083
13	3.552578	10.124.211.96	10.124.211.200	HTTP	1353	HTTP/1.1 200 OK (text/html)
14	3.552589	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=607 Ack=3973 Win=39040 Len=0 TSval=126501 TSecr=223083
15	5.968993	10.124.211.200	10.124.211.96	HTTP	410	GET /newsdetails.php?id=26 HTTP/1.1
16	6.020439	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
17	6.020461	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=951 Ack=5298 Win=41856 Len=0 TSval=127118 TSecr=223701
18	6.020470	10.124.211.96	10.124.211.200	HTTP	83	HTTP/1.1 200 OK (text/html)
19	6.020471	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=951 Ack=5315 Win=41856 Len=0 TSval=127118 TSecr=223701
20	9.453656	10.124.211.200	10.124.211.96	HTTP	373	GET /newsdetails.php?id=26%27 HTTP/1.1
21	9.517192	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
22	9.517210	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1258 Ack=6640 Win=44800 Len=0 TSval=127992 TSecr=224575
23	9.517216	10.124.211.96	10.124.211.200	HTTP	68	HTTP/1.1 200 OK (text/html)
24	9.517218	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1258 Ack=6642 Win=44800 Len=0 TSval=127992 TSecr=224575
25	14.520484	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [FIN, ACK] Seq=6642 Ack=1258 Win=18768 Len=0 TSval=225826 TSecr=127992
26	14.520662	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [FIN, ACK] Seq=1258 Ack=6643 Win=44800 Len=0 TSval=129243 TSecr=225826
27	14.582082	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [ACK] Seq=6643 Ack=1259 Win=18768 Len=0 TSval=225842 TSecr=129243
28	17.437742	10.124.211.200	10.124.211.96	TCP	74	33022 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=129973 TSecr=0 WS=128
29	17.503661	10.124.211.96	10.124.211.200	TCP	74	80 → 33022 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=226572 TSecr=129973 WS=4

Here we see in the packet 20 there is GET request to /newsdetials.php?id=26%27 which this %27 is url encoding:



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3	0.056747	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=125627 TSecr=222206
4	0.056824	10.124.211.200	10.124.211.96	HTTP	349	GET / HTTP/1.1
5	0.133531	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [ACK] Seq=1 Ack=284 Win=15552 Len=0 TSval=222223 TSecr=125627
6	0.133549	10.124.211.96	10.124.211.200	HTTP	101	[TCP Previous segment not captured] Continuation
7	0.133556	10.124.211.200	10.124.211.96	TCP	78	[TCP Window Update] 33020 → 80 [ACK] Seq=284 Ack=1 Win=30336 Len=0 TSval=125647 TSecr=222223 SLE=1326 SRE=1361
8	0.156230	10.124.211.96	10.124.211.200	TCP	1391	[TCP Out-Of-Order] 80 → 33020 [ACK] Seq=1 Ack=284 Win=15552 Len=1325 TSval=222224 TSecr=125627
9	0.156259	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=284 Ack=1361 Win=33280 Len=0 TSval=125652 TSecr=222224
10	3.481485	10.124.211.200	10.124.211.96	HTTP	389	GET /news.php HTTP/1.1
11	3.552272	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
12	3.552305	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=607 Ack=2686 Win=36096 Len=0 TSval=126501 TSecr=223083
13	3.552578	10.124.211.96	10.124.211.200	HTTP	1353	HTTP/1.1 200 OK (text/html)
14	3.552589	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=607 Ack=3973 Win=39040 Len=0 TSval=126501 TSecr=223083
15	5.968993	10.124.211.200	10.124.211.96	HTTP	410	GET /newsdetails.php?id=26 HTTP/1.1
16	6.020439	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
17	6.020461	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=951 Ack=5298 Win=41856 Len=0 TSval=127118 TSecr=223701
18	6.020470	10.124.211.96	10.124.211.200	HTTP	83	HTTP/1.1 200 OK (text/html)
19	6.020471	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=951 Ack=5315 Win=41856 Len=0 TSval=127118 TSecr=223701
20	9.453656	10.124.211.200	10.124.211.96	HTTP	373	GET /newsdetails.php?id=26%27 HTTP/1.1
21	9.517192	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
22	9.517210	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1258 Ack=6640 Win=44800 Len=0 TSval=127992 TSecr=224575
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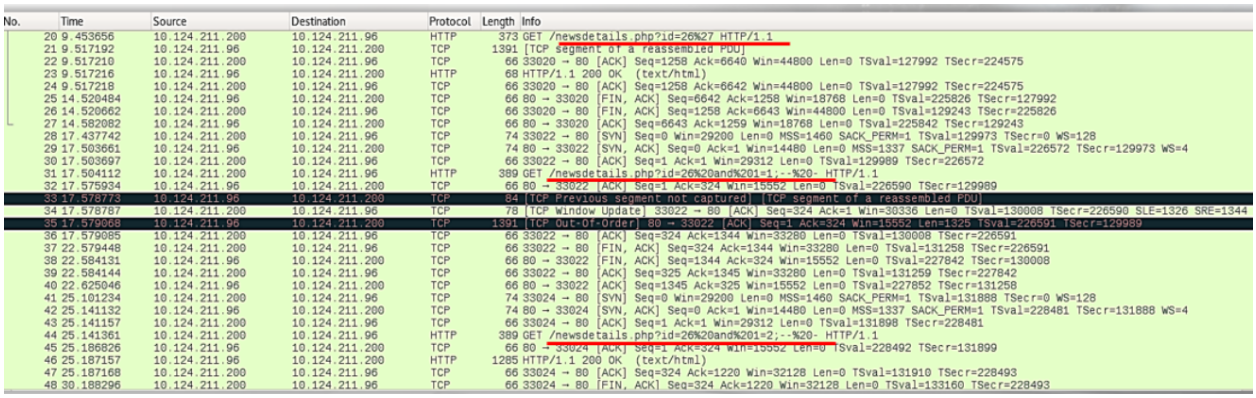
25	14.520484	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [FIN, ACK] Seq=6642 Ack=1258 Win=18768 Len=0 TSval=225826 TSecr=127992
26	14.520662	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [FIN, ACK] Seq=1258 Ack=6643 Win=44800 Len=0 TSval=129243 TSecr=225826
27	14.582082	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [ACK] Seq=6643 Ack=1259 Win=18768 Len=0 TSval=225842 TSecr=129243
28	17.437742	10.124.211.200	10.124.211.96	TCP	74	33022 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=129973 TSecr=0 WS=128
29	17.503661	10.124.211.96	10.124.211.200	TCP	74	80 → 33022 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=226572 TSecr=129973 WS=4

Here is highlighted that part, and that %27 means a single quote (‘), this is used by attackers to find SQL injection. This might be a Type but for this to prove we need to look to dive deep and prov it.

If look further we see the signs of this SQLi inject in more packets as well.



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21	9.517192	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
22	9.517210	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [ACK] Seq=1258 Ack=6640 Win=44800 Len=0 TSval=127992 TSecr=224575
23	9.517216	10.124.211.96	10.124.211.200	HTTP	68	HTTP/1.1 200 OK (text/html)
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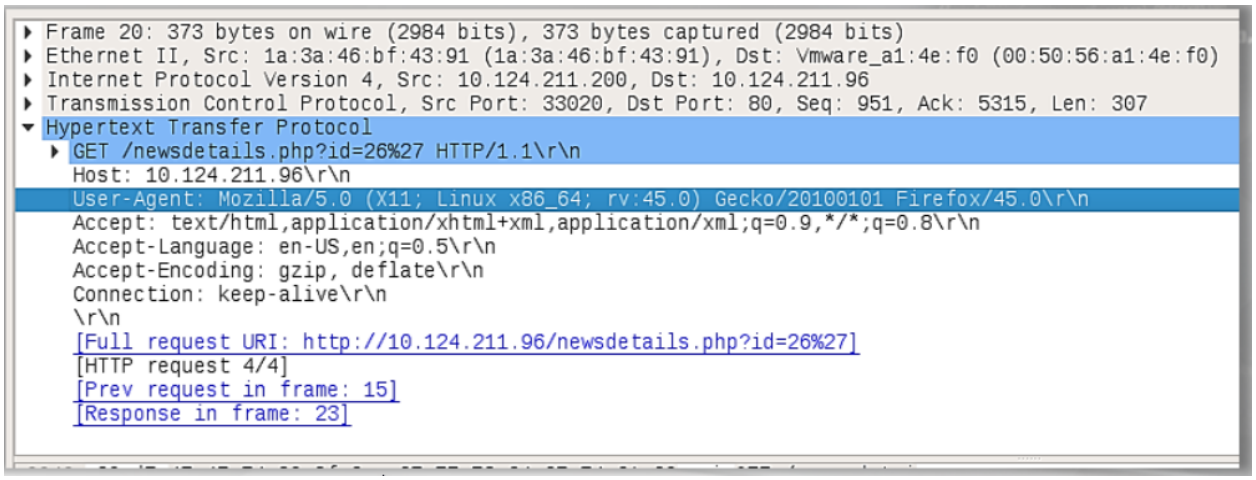
25	14.520484	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [FIN, ACK] Seq=6642 Ack=1258 Win=18768 Len=0 TSval=225826 TSecr=127992
26	14.520662	10.124.211.200	10.124.211.96	TCP	66	33020 → 80 [FIN, ACK] Seq=1258 Ack=6643 Win=44800 Len=0 TSval=129243 TSecr=225826
27	14.582082	10.124.211.96	10.124.211.200	TCP	66	80 → 33020 [ACK] Seq=6643 Ack=1259 Win=18768 Len=0 TSval=225842 TSecr=129243
28	17.437742	10.124.211.200	10.124.211.96	TCP	74	33022 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=129973 TSecr=0 WS=128
29	17.503661	10.124.211.96	10.124.211.200	TCP	74	80 → 33022 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=226572 TSecr=129973 WS=4
30	17.503697	10.124.211.200	10.124.211.96	TCP	66	33022 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=129989 TSecr=226572
31	17.504112	10.124.211.200	10.124.211.96	HTTP	389	GET /newsdetails.php?id=26%20and%201=1;--%20- HTTP/1.1
32	17.575934	10.124.211.96	10.124.211.200	TCP	66	80 → 33022 [ACK] Seq=1 Ack=324 Win=15552 Len=0 TSval=226590 TSecr=129989
33	17.578773	10.124.211.96	10.124.211.200	TCP	84	[TCP Previous segment not captured] [TCP segment of a reassembled PDU]
34	17.578787	10.124.211.200	10.124.211.96	TCP	78	[TCP Window Update] 33022 → 80 [ACK] Seq=324 Ack=1 Win=30336 Len=0 TSval=130008 TSecr=226590 SLE=1326 SRE=1344
35	17.579068	10.124.211.96	10.124.211.200	TCP	1391	[TCP Out-Of-Order] 80 → 33022 [ACK] Seq=1 Ack=324 Win=15552 Len=1325 TSval=226591 TSecr=129989
36	17.579085	10.124.211.200	10.124.211.96	TCP	66	33022 → 80 [ACK] Seq=324 Ack=1344 Win=33280 Len=0 TSval=130008 TSecr=226591
37	22.579448	10.124.211.200	10.124.211.96	TCP	66	33022 → 80 [FIN, ACK] Seq=324 Ack=1344 Win=33280 Len=0 TSval=131258 TSecr=226591
38	22.584131	10.124.211.96	10.124.211.200	TCP	66	80 → 33022 [FIN, ACK] Seq=1344 Ack=324 Win=15552 Len=0 TSval=227842 TSecr=130008
39	22.584144	10.124.211.200	10.124.211.96	TCP	66	33022 → 80 [ACK] Seq=325 Ack=1345 Win=33280 Len=0 TSval=131259 TSecr=227842
40	22.625046	10.124.211.96	10.124.211.200	TCP	66	80 → 33022 [ACK] Seq=1345 Ack=325 Win=15552 Len=0 TSval=227852 TSecr=131258
41	25.101234	10.124.211.200	10.124.211.96	TCP	74	33024 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=131888 TSecr=0 WS=128
42	25.141132	10.124.211.96	10.124.211.200	TCP	74	80 → 33024 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=228481 TSecr=131888 WS=4
43	25.141157	10.124.211.200	10.124.211.96	TCP	66	33024 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=131898 TSecr=228481
44	25.141361	10.124.211.200	10.124.211.96	HTTP	389	GET /newsdetails.php?id=26%20and%201=2;--%20- HTTP/1.1
45	25.186826	10.124.211.96	10.124.211.200	TCP	66	80 → 33024 [ACK] Seq=1 Ack=324 Win=15552 Len=0 TSval=228492 TSecr=131899
46	25.187157	10.124.211.96	10.124.211.200	HTTP	1285	HTTP/1.1 200 OK (text/html)
47	25.187168	10.124.211.200	10.124.211.96	TCP	66	33024 → 80 [ACK] Seq=324 Ack=1220 Win=32128 Len=0 TSval=131910 TSecr=228493
48	30.188296	10.124.211.200	10.124.211.96	TCP	66	33024 → 80 [FIN, ACK] Seq=324 Ack=1220 Win=32128 Len=0 TSval=133160 TSecr=228493

Here If we look at packet 31,44 we see more attempts of using URL encoding which are Payloads of SQLi.

So its very important for a good hunter to understand Red Team tactics and recognize malicious actions, so we have to think like an attack.

Lets check if the attacker is using a tool or the attacker is trying it manually, and we do that by looking at the User-Agent which is the client or the browser that makes the request and this can be easily spoofed but we will still look at it:



```
▸ Frame 20: 373 bytes on wire (2984 bits), 373 bytes captured (2984 bits)
▸ Ethernet II, Src: 1a:3a:46:bf:43:91 (1a:3a:46:bf:43:91), Dst: Vmware_a1:4e:f0 (00:50:56:a1:4e:f0)
▸ Internet Protocol Version 4, Src: 10.124.211.200, Dst: 10.124.211.96
▸ Transmission Control Protocol, Src Port: 33020, Dst Port: 80, Seq: 951, Ack: 5315, Len: 307
▾ Hypertext Transfer Protocol
  ▸ GET /newsdetails.php?id=26%27 HTTP/1.1\r\n
    Host: 10.124.211.96\r\n
    User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:45.0) Gecko/20100101 Firefox/45.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: en-US,en;q=0.5\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://10.124.211.96/newsdetails.php?id=26%27]
    [HTTP request 4/4]
    [Prev request in frame: 15]
    [Response in frame: 23]
```

We see the user agent is Mozilla and the OS is Linux and we said this can be easily spoofed, lets check for the other 2 packets, the 44 and 31:

```
▸ Frame 44: 389 bytes on wire (3112 bits), 389 bytes captured (3112 bits)
▸ Ethernet II, Src: 1a:3a:46:bf:43:91 (1a:3a:46:bf:43:91), Dst: Vmware_a1:4e:f0 (00:50:56:a1:4e:f0)
▸ Internet Protocol Version 4, Src: 10.124.211.200, Dst: 10.124.211.96
▸ Transmission Control Protocol, Src Port: 33024, Dst Port: 80, Seq: 1, Ack: 1, Len: 323
▾ Hypertext Transfer Protocol
  ▸ GET /newsdetails.php?id=26%20and%201=2;--%20- HTTP/1.1\r\n
    Host: 10.124.211.96\r\n
    User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:45.0) Gecko/20100101 Firefox/45.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: en-US,en;q=0.5\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://10.124.211.96/newsdetails.php?id=26%20and%201=2;--%20-]
    [HTTP request 1/1]
    [Response in frame: 46]
```

```
▸ Frame 31: 389 bytes on wire (3112 bits), 389 bytes captured (3112 bits)
▸ Ethernet II, Src: 1a:3a:46:bf:43:91 (1a:3a:46:bf:43:91), Dst: Vmware_a1:4e:f0 (00:50:56:a1:4e:f0)
▸ Internet Protocol Version 4, Src: 10.124.211.200, Dst: 10.124.211.96
▸ Transmission Control Protocol, Src Port: 33022, Dst Port: 80, Seq: 1, Ack: 1, Len: 323
▾ Hypertext Transfer Protocol
  ▸ GET /newsdetails.php?id=26%20and%201=1;--%20- HTTP/1.1\r\n
    Host: 10.124.211.96\r\n
    User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:45.0) Gecko/20100101 Firefox/45.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: en-US,en;q=0.5\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://10.124.211.96/newsdetails.php?id=26%20and%201=1;--%20-]
    [HTTP request 1/1]
```

It looks the same User-agent, this might mean the attacker is doing this SQLi manually.

After we see an attack attempts we should always check if the attack was successful or not, so lets look at the packet 20 response which the attacker put %27 which is (‘).

```
\t<!-- end sidebar -->\n
\t<div id="content">\n
\t\t<div><img src="images/img08.jpg" alt="" width="740" height="220" /></div>\n
\t\t<div class="boxed">\n
\t\t\t<h1 class="title2">\n
\n
<br />\n
<b>Warning</b>:  mysqli_fetch_array() expects parameter 1 to be mysqli_result, boolean given in <b>/var/www/newsdetails.php</b> on line <b>11</b><br />\n
\n
\n
</h1>\n
<p>\n
<br />\n
<b>Warning</b>:  mysqli_fetch_array() expects parameter 1 to be mysqli_result, boolean given in <b>/var/www/newsdetails.php</b> on line <b>29</b><br />\n
</p>\n
\n
        </div>\n
```

Here we see In the response the attacker got a mysql Error, that mean that our system is indeed vulnerable mean this single quote (‘) made to the Database was executed by the database.

The response to packet 31 isnt captured for some reason as we see it in black:

```
33 17.578773   10.124.211.96   10.124.211.200   TCP   84 [TCP Previous segment not captured] [TCP segment of a reassembled PDU]
34 17.578787   10.124.211.200  10.124.211.96    TCP   78 [TCP Window Update] 33022 → 80 [ACK] Seq=324 Ack=1 Win=30336 Len=0 TSval=130008 TSecr=226590 SLE=1326 SRE=1344
35 17.579068   10.124.211.96   10.124.211.200   TCP   1391 [TCP Out-Of-Order] 80 → 33022 [ACK] Seq=1 Ack=324 Win=15552 Len=1325 TSval=226591 TSecr=129989
```

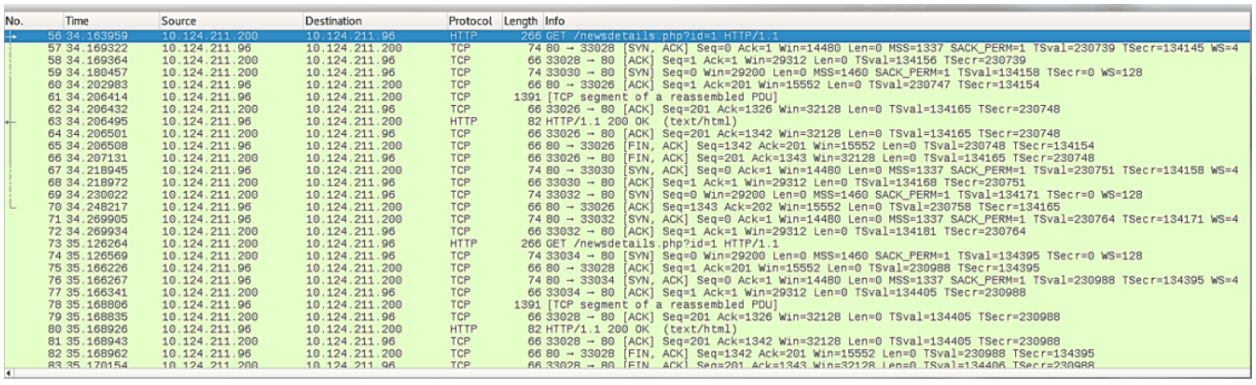
Lets look at the packet response of the packet 44 attempt of SQLi:

```
\t\t\t<form id="form1" method="post" action="login.php">\n
\t\t\t\t<fieldset>\n
\t\t\t\t<label for="inputtext1">Email:</label>\n
\t\t\t\t<input id="inputtext1" type="text" name="username" value=""/>\n
\t\t\t\t<label for="inputtext2">Password:</label>\n
\t\t\t\t<input id="inputtext2" type="password" name="password" value="" />\n
\t\t\t\t<input id="inputsubmit1" type="submit" name="submit" value="Login" />\n
\t\t\t\t<p><a href="#">Forgo your password?</a><br />\n
\t\t\t\t</fieldset>\n
\t\t\t</form>\n
\t\t</div>\n
\t</div>\n
\t<!-- end sidebar -->\n
\t<div id="content">\n
\t\t<div><img src="images/img08.jpg" alt="" width="740" height="220" /></div>\n
\t\t<div class="boxed">\n
\t\t\t<h1 class="title2">\n
\n
\n
\n
</h1>\n
<p>\n
</p>\n
\n
        </div>\n
\t    </div>\n
\t<!-- end content -->\n
\t<div style="clear: both;"> </div>\n
</div>\n
<!-- end page -->\n
<div id="footer">\n
\t<p id="legal">Copyright &copy; 2017 AwdMgmt.</p>\n
\t<p id="links"><a href="#">Privacy terms</a> | <a href="#">Licensing</a></p>\n
```

Even though we saw the SQLi attempt on packet 44, in its response in packet 46, we don't see any error.

One common thing is that when an attacker finds a vulnerability by manually looking for it, it will start to exploit it using tools, so here the attacker did discover the vulnerability.

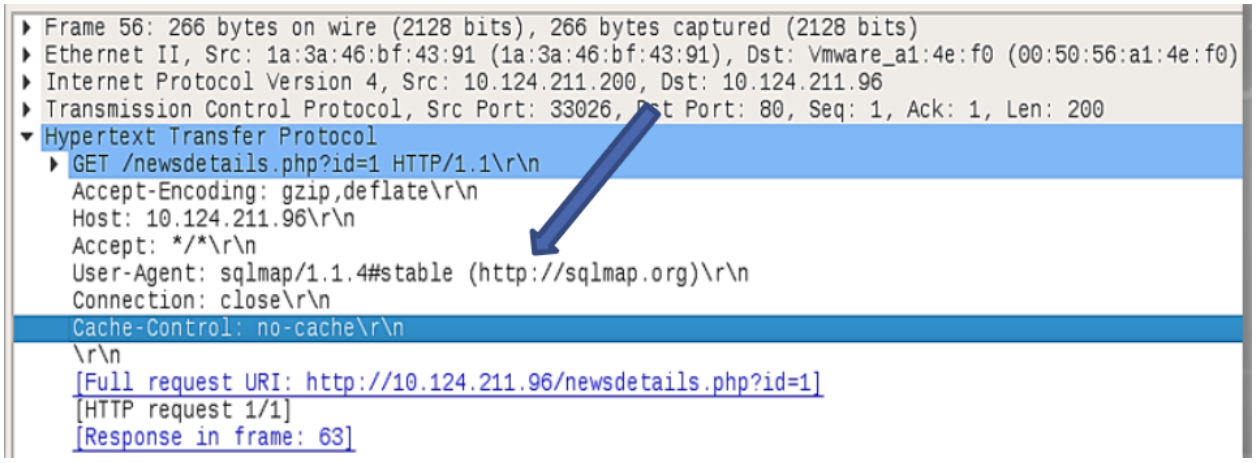
Lets look at the packets after it:



No.	Time	Source	Destination	Protocol	Length	Info
56	34.163959	10.124.211.200	10.124.211.96	HTTP	266	GET /newsdetails.php?id=1 HTTP/1.1
57	34.169322	10.124.211.96	10.124.211.200	TCP	74	80 → 33028 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=230739 TSecr=134145 WS=4
58	34.169364	10.124.211.200	10.124.211.96	TCP	66	33028 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=134156 TSecr=230739
59	34.180457	10.124.211.200	10.124.211.96	TCP	74	33030 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=134158 TSecr=0 WS=128
60	34.202983	10.124.211.96	10.124.211.200	TCP	66	80 → 33026 [ACK] Seq=1 Ack=201 Win=15552 Len=0 TSval=230747 TSecr=134154
61	34.206414	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
62	34.206432	10.124.211.200	10.124.211.96	TCP	66	33026 → 80 [ACK] Seq=201 Ack=1326 Win=32128 Len=0 TSval=134165 TSecr=230748
63	34.206495	10.124.211.96	10.124.211.200	HTTP	82	HTTP/1.1 200 OK (text/html)
64	34.206501	10.124.211.200	10.124.211.96	TCP	66	33026 → 80 [ACK] Seq=201 Ack=1342 Win=32128 Len=0 TSval=134165 TSecr=230748
65	34.206508	10.124.211.96	10.124.211.200	TCP	66	80 → 33026 [FIN, ACK] Seq=1342 Ack=201 Win=15552 Len=0 TSval=230748 TSecr=134154
66	34.207131	10.124.211.200	10.124.211.96	TCP	66	33026 → 80 [FIN, ACK] Seq=201 Ack=1343 Win=32128 Len=0 TSval=134165 TSecr=230748
67	34.218945	10.124.211.96	10.124.211.200	TCP	74	80 → 33030 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=230751 TSecr=134158 WS=4
68	34.218972	10.124.211.200	10.124.211.96	TCP	66	33030 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=134168 TSecr=230751
69	34.230022	10.124.211.200	10.124.211.96	TCP	74	33032 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=134171 TSecr=0 WS=128
70	34.248217	10.124.211.96	10.124.211.200	TCP	66	80 → 33026 [ACK] Seq=1343 Ack=202 Win=15552 Len=0 TSval=230758 TSecr=134165
71	34.269905	10.124.211.96	10.124.211.200	TCP	74	80 → 33032 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=230764 TSecr=134171 WS=4
72	34.269934	10.124.211.200	10.124.211.96	TCP	66	33032 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=134181 TSecr=230764
73	35.126264	10.124.211.200	10.124.211.96	HTTP	266	GET /newsdetails.php?id=1 HTTP/1.1
74	35.126569	10.124.211.200	10.124.211.96	TCP	74	33034 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=134395 TSecr=0 WS=128
75	35.166226	10.124.211.96	10.124.211.200	TCP	66	80 → 33028 [ACK] Seq=1 Ack=201 Win=15552 Len=0 TSval=230988 TSecr=134395
76	35.166267	10.124.211.96	10.124.211.200	TCP	74	80 → 33034 [SYN, ACK] Seq=0 Ack=1 Win=14480 Len=0 MSS=1337 SACK_PERM=1 TSval=230988 TSecr=134395 WS=4
77	35.166341	10.124.211.200	10.124.211.96	TCP	66	33034 → 80 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=134405 TSecr=230988
78	35.168806	10.124.211.96	10.124.211.200	TCP	1391	[TCP segment of a reassembled PDU]
79	35.168835	10.124.211.200	10.124.211.96	TCP	66	33028 → 80 [ACK] Seq=201 Ack=1326 Win=32128 Len=0 TSval=134405 TSecr=230988
80	35.168926	10.124.211.96	10.124.211.200	HTTP	82	HTTP/1.1 200 OK (text/html)
81	35.168943	10.124.211.200	10.124.211.96	TCP	66	33028 → 80 [ACK] Seq=201 Ack=1342 Win=32128 Len=0 TSval=134405 TSecr=230988
82	35.168962	10.124.211.96	10.124.211.200	TCP	66	80 → 33028 [FIN, ACK] Seq=1342 Ack=201 Win=15552 Len=0 TSval=230988 TSecr=134395
83	35.170154	10.124.211.200	10.124.211.96	TCP	66	33028 → 80 [FIN, ACK] Seq=201 Ack=1343 Win=32128 Len=0 TSval=134406 TSecr=230988

Strangely we don't see any SQLi payload in the ID field. Is it because the attacker found the vulnerability and stopped?

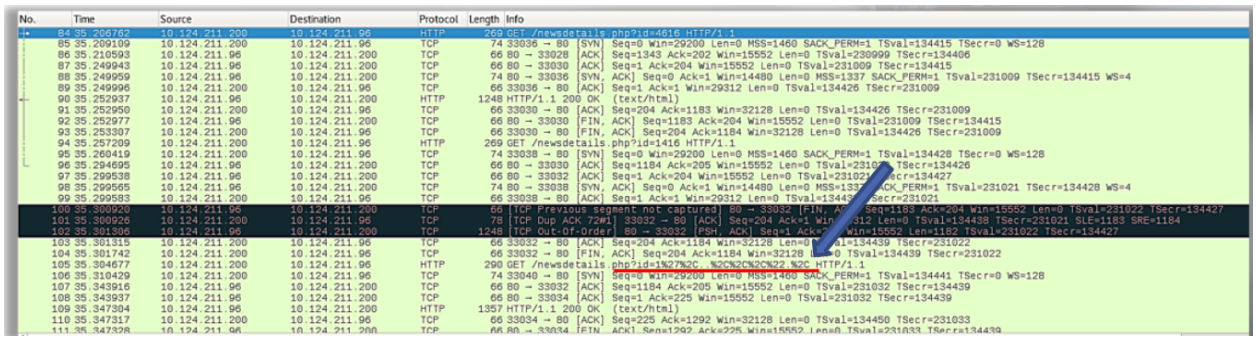
Lets take a closer look at the packet 56:



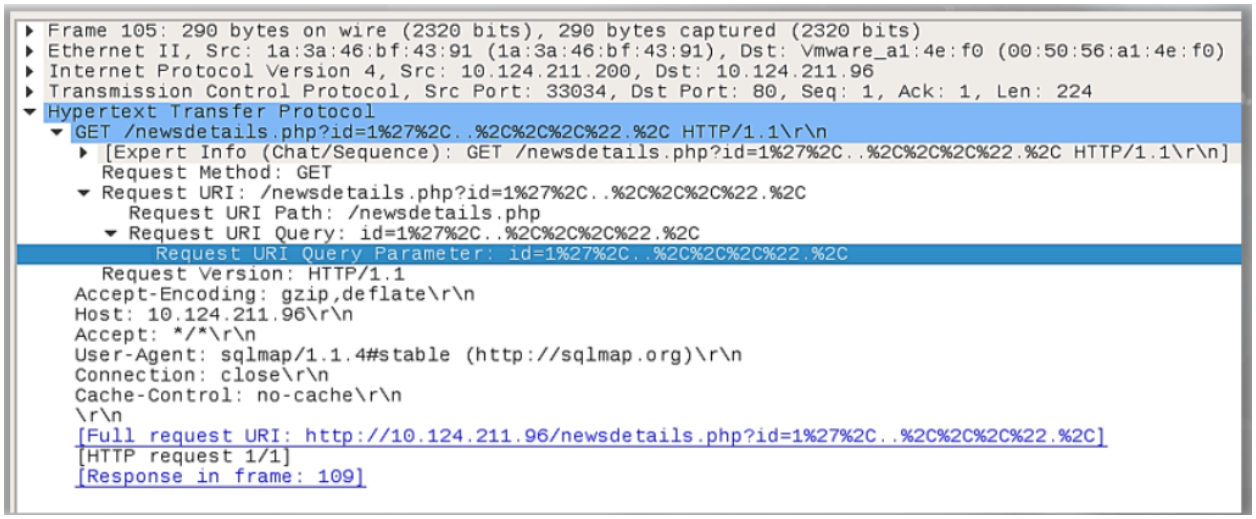
As we see the user agent is “sqlmap” which is a tool used to exploit SQLi vulnerability. As we guessed the attackers will find vulnerabilities and then use automated tools to exploit the best way they can.

The same thing apply to the rest of the packets form the same IP, all the request have “sqlmap” User-Agent.

If we scroll down, in packet 105 we will see that the ID field is target again:

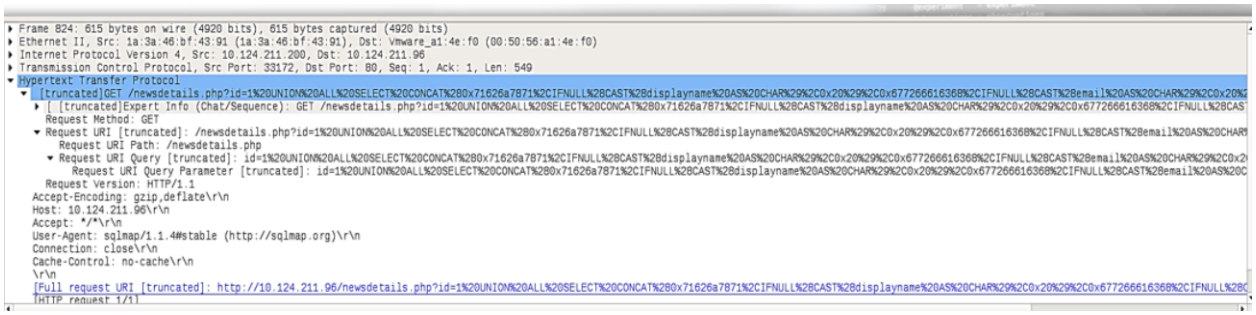


We see the URL encoding here, lets look into this packet 105:



Here we can clearly see the URL encoding and the User-Agent:

In the last packet we see a long Query or SQLi payload:



We found out that the IP doing this SQLi is 10.124.211.200 and its internal IP. So for us to find out is it an malicious Insider doing this or an attacker who compromised a system and from it trying to exploit this SQLi.